PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of: Attorney Docket No.: 3425.05US02

Vetter Confirmation No.: 7868

Patent No.: 7,464,619 Application No.: 10/790,667

Issued: December 16, 2008 Filed: March 1, 2004

For: OPERATOR ASSEMBLY

PETITION UNDER 37 C.F.R. § 1.705(d)

Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

1. Applicant hereby petitions under 37 CFR § 1.705(d) that the patent term adjustment for U.S. Patent No. 7,464,619 be changed from 592 days to 1201 days, in accordance with the requirements of justice.

STATEMENT OF FACTS

2. On September 30, 2008, the United States District Court for the District of Columbia rendered a decision that refuted the USPTO's method for calculating patent term adjustment as inconsistent with 35 USC § 154(b) and set forth the proper method of calculation in Wyeth et al. v. Dudas, Civ. Action No. 1:07-cv-01492-JR. (See Wyeth et

al. v. Dudas, Case No. 1:07-cv-01492-JR, Mem. Op., dkt. no. 27 (D.D.C. September 30, 2008) attached hereto as Attachment A).

3. Specifically, in Wyeth, the court found that the United States Patent and Trademark Office (USPTO) has been misapplying 35 U.S.C. § 154(b)(2)(A) when calculating patent term adjustment, thereby routinely denying many applicants patent term to which they are entitled under the statute.

4. The USPTO had published and implemented its interpretation of 35 U.S.C. 154(b)(2)(A) stating that the statute means "that if an application is entitled to an adjustment under the three-year pendency provision of 35 U.S.C.§ 154(b)(1)(B), the entire period during which the application was pending before the office (except for periods excluded under 35 U.S.C. § 154(b)(1)(B)(i)-(iii)), and not just the period beginning three years after the actual filing date of the application, is the relevant period under 35 U.S.C. § 154(b)(1)(B) in determining whether periods of delay "overlap" under 35 U.S.C. 154(b)(2)(A)." 69 Fed. Reg. 21706 (April 22, 2004).

5. In Wyeth, the court found the USPTO interpretation of 35 U.S.C. 154(b)(2)(A) does not square with the language of the statute and that the USPTO should not consider an application delayed under 154(b)(1)(B) during the period before it has been delayed and that the delay under section (B) begins when the PTO has failed to issue a patent within three years, not before. See Wyeth, Slip Op. at 8.

6. U.S. Patent No. 7,464,619 ("the '619 Patent") issued to inventor Gregory J. Vetter on December 16, 2008. The patent term adjustment, as determined by the USPTO under 35 USC § 154(b), and listed on the face of the '619 patent is 592 days. This patent is not subject to a terminal disclaimer. The '619 patent is attached as Attachment B.

7. The USPTO's determination of 592 days of patent term adjustment is in error in that, pursuant to 35 USC § 154(b)(1)(B), the USPTO failed to properly allow an adjustment for the time exceeding three years after the actual filing date of the '619 patent to its date of issue. See Attachment C comprising a hardcopy of the USPTO PTA calculation from the PAIR system.

8. U.S. Patent No. 7,464,619 was filed on March 1, 2004, and issued on December 16, 2008. See Attachment C.

9. Under 35 USC § 154(b)(1)(A), Applicant is entitled to an adjustment of the term of the '619 patent for a period of 716 days, which is the number of days attributable to PTO examination delay ("A Delay").

10. Under 35 USC § 154(b)(1)(A), Applicant is entitled to an additional adjustment of the term of the '619 patent for a period of 656 days, which is the number of days the issue date of the '619 patent exceeds three years from the filing date of the application not

including any time consumed by continued examination of the application requested by the applicant under section 132(b). ("B Delay").

11. Section 35 USC § 154(b)(2)(A) states that "to the extent...periods of delay attributable to grounds specified in paragraph [154(b)(1)] overlap, the period of any adjustment granted under this subsection shall not exceed the actual number of days the issuance of the patent was delayed." For the '892 patent, 47 days of the A Delay overlaps with the B Delay period. Therefore, there are 47 overlap days to be excluded for the patent term adjustment.

12. The total period of PTO delay is 1325 days, which is the sum of the A Delay (716 days) and B Delay (656 days) minus the period of overlap (47 days).

13. Under 35 USC §154(b)(2)(C), the total period of PTO delay is reduced by the period of applicant delay, which is 124 days as determined by the USPTO. This period is reduced for the period taken to reply in excess of three months to each of the July 18, 2007 and January 14, 2008 Non-final Office Actions as well as for submission of drawings after allowance on November 13, 2008. These are believed to be the only circumstances during prosecution that constitute a reduction of PTO delay. See Attachment C.

14. Therefore, the correct patent term adjustment under 35 USC § 154(b)(1) and (2) is 1201 days, the difference between the total period of PTO delay (1325 days) and the period of applicant delay (124 days).

15. The Applicant's credit of only 592 days of patent term adjustment for the '619 patent is arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law and in excess of statutory jurisdiction, authority or limitation.

16. Accordingly, Applicant and the undersigned respectfully submit that justice requires that the patent term adjustment credited U.S. Patent No. 7,464,619 be changed from 592 days to 1201 days.

Respectfully submitted,

James P. Rieke
Registration No. 55,572

Customer No. 24113
Patterson, Thuente, Skaar & Christensen, P.A.
4800 IDS Center
80 South 8th Street
Minneapolis, Minnesota 55402-2100
Telephone: (612) 349-5746

Please grant any extension of time necessary for entry; charge any fee due to Deposit Account No. 16-0631.

ATTACHMENT A

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

WYETH, *et al.*,	:	
	:	
Plaintiffs,	:	
	:	
v.	:	Civil Action No. 07-1492 (JR)
	:	
JON W. DUDAS, Under Secretary of Commerce for Intellectual Property and Director of U.S. Patent and Trademark Office,	:	
	:	
Defendant.	:	

MEMORANDUM OPINION

Plaintiffs here take issue with the interpretation that the United States Patent and Trademark Office (PTO) has imposed upon 35 U.S.C. § 154, the statute that prescribes patent terms. Section 154(a)(2) establishes a term of 20 years from the day on which a successful patent application is first filed. Because the clock begins to run on this filing date, and not on the day the patent is actually granted, some of the effective term of a patent is consumed by the time it takes to prosecute the application. To mitigate the damage that bureaucracy can do to inventors, the statute grants extensions of patent terms for certain specified kinds of PTO delay, 35 U.S.C. § 154(b)(1)(A), and, regardless of the reason, whenever the patent prosecution takes more than three years. 35 U.S.C. § 154(b)(1)(B). Recognizing that the protection provided by these separate guarantees might overlap, Congress has forbidden double-counting: "To the extent that periods of delay attributable to grounds

specified in paragraph (1) overlap, the period of any adjustment granted under this subsection shall not exceed the actual number of days the issuance of the patent was delayed." 35 U.S.C. § 154(b)(2)(A). Plaintiffs claim that the PTO has misconstrued or misapplied this provision, and that the PTO is denying them a portion of the term Congress has provided for the protection of their intellectual property rights.

Statutory Scheme

Until 1994, patent terms were 17 years from the date of issuance. See 35 U.S.C. § 154 (1992) ("Every patent shall contain . . . a grant . . . for the term of seventeen years . . . of the right to exclude others from making, using, or selling the invention throughout the United States. . . ."). In 1994, in order to comply with treaty obligations under the General Agreement on Tarriffs and Trade (GATT), the statute was amended to provide a 20-year term from the date on which the application is first filed. See Pub. L. No. 103-465, § 532, 108 Stat. 4809, 4984 (1994). In 1999, concerned that extended prosecution delays could deny inventors substantial portions of their effective patent terms under the new regime, Congress enacted the American Inventors Protection Act, a portion of which -- referred to as the Patent Term Guarantee Act of 1999 -- provided for the adjustments that are at issue in this case. Pub. L. No. 106-113, §§ 4401-4402, 113 Stat. 1501, 1501A-557 (1999).

As currently codified, 35 U.S.C. § 154(b) provides three guarantees of patent term, two of which are at issue here. The first is found in subsection (b)(1)(A), the "[g]uarantee of prompt Patent and Trademark Office response." It provides a one-day extension of patent term for every day that issuance of a patent is delayed by a failure of the PTO to comply with various enumerated statutory deadlines: fourteen months for a first office action; four months to respond to a reply; four months to issue a patent after the fee is paid; and the like. See 35 U.S.C. § 154(b)(1)(A)(i)-(iv). Periods of delay that fit under this provision are called "A delays" or "A periods." The second provision is the "[g]uarantee of no more than 3-year application pendency." Under this provision, a one-day term extension is granted for every day greater than three years after the filing date that it takes for the patent to issue, regardless of whether the delay is the fault of the PTO.[1] See 35 U.S.C. § 154(b)(1)(B). The period that begins after the three-year window has closed is referred to as the "B delay" or the "B period". ("C delays," delays resulting from interferences, secrecy orders, and appeals, are similarly treated but were not involved in the patent applications underlying this suit.)

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[1] Certain reasons for exceeding the three-year pendency period are excluded, see 35 U.S.C. § 154(b)(1)(b)(i)-(iii), as are periods attributable to the applicant's own delay. See 35 U.S.C. § 154(b)(2)(C).

The extensions granted for A, B, and C delays are subject to the following limitation:

> **(A) In general.**--To the extent that periods of delay attributable to grounds specified in paragraph (1) overlap, the period of any adjustment granted under this subsection shall not exceed the actual number of days the issuance of the patent was delayed.

35 U.S.C. § 154(b)(2)(A). This provision is manifestly intended to prevent double-counting of periods of delay, but understanding that intent does not answer the question of what is double-counting and what is not. Proper interpretation of this proscription against windfall extensions requires an assessment of what it means for "periods of delay" to "overlap."

The PTO, pursuant to its power under 35 U.S.C. § 154(b)(3)(A) to "prescribe regulations establishing procedures for the application for and determination of patent term adjustments," has issued final rules and an "explanation" of the rules, setting forth its authoritative construction of the double-counting provision. The rules that the PTO has promulgated essentially parrot the statutory text, see 37 C.F.R. § 1.703(f), and so the real interpretive act is found in something the PTO calls its Explanation of 37 CFR 1.703(f) and of the United States Patent and Trademark Office Interpretation of 35 U.S.C. § 154(b)(2)(A), which was published on June 21, 2004, at 69 Fed. Reg. 34238. Here, the PTO "explained" that:

> the Office has consistently taken the position that if an application is entitled to an adjustment under the three-year pendency provision of 35 U.S.C. § 154(b)(1)(B), the entire period during which the application was pending before the Office (except for periods excluded under 35 U.S.C. § 154(b)(1)(B)(i)-(iii)), and not just the period beginning three years after the actual filing date of the application, is the relevant period under 35 U.S.C. § 154(b)(1)(B) in determining whether periods of delay "overlap" under 35 U.S.C. 154(b)(2)(A).

69 Fed. Reg. 34238 (2004) (emphasis added). In short, the PTO's view is that any administrative delay under § 154(b)(1)(A) overlaps any 3-year maximum pendency delay under § 154(b)(1)(B): the applicant gets credit for "A delay" or for "B delay," whichever is larger, but never A + B.

In the plaintiffs' submission, this interpretation does not square with the language of the statute. They argue that the "A period" and "B period" overlap only if they occur on the same calendar day or days. Consider this example, proffered by plaintiff: A patent application is filed on 1/1/02. The patent issues on 1/1/08, six years later. In that six-year period are two "A periods," each one year long: (1) the 14-month deadline for first office action is 3/1/03, but the first office action does not occur until 3/1/04, one year late; (2) the 4-month deadline for patent issuance after payment of the issuance fee is

1/1/07, but the patent does not issue until 1/1/08, another year of delay attributable to the PTO. According to plaintiff, the "B period" begins running on 1/1/05, three years after the patent application was filed, and ends three years later, with the issuance of the patent on 1/1/08. In this example, then, the first "A period" does not overlap the "B period," because it occurs in 2003-04, not in 2005-07. The second "A period," which covers 365 of the same days covered by the "B period," does overlap. Thus, in plaintiff's submission, this patent holder is entitled to four years of adjustment (one year of "A period" delay + three years of "B period" delay). But in the PTO's view, since "the entire period during which the application was pending before the office" is considered to be "B period" for purposes of identifying "overlap," the patent holder gets only three years of adjustment.

Chevron Deference

We must first decide whether the PTO's interpretation is entitled to deference under Chevron v. NRDC, 467 U.S. 837 (1984). No, the plaintiffs argue, because, under the Supreme Court's holdings in Gonzales v. Oregon, 546 U.S. 243 (2006), and United States v. Mead Corp., 533 U.S. 218 (2001), Congress has not "delegated authority to the agency generally to make rules carrying the force of law," and in any case the interpretation at issue here was not promulgated pursuant to any such authority.

See Gonzales, 546 U.S. at 255-56, citing Mead, 533 U.S. at 226-27. Since at least 1996, the Federal Circuit has held that the PTO is not afforded Chevron deference because it does not have the authority to issue substantive rules, only procedural regulations regarding the conduct of proceedings before the agency. See Merck & Co. v. Kessler, 80 F.3d 1543, 1549-50 (Fed. Cir. 1996).

Here, as in Merck, the authority of the PTO is limited to prescribing "regulations establishing procedures for the application for and determination of patent term adjustments under this subsection." 35 U.S.C. § 154(b)(3)(A) (emphasis added). Indeed, a comparison of this rulemaking authority with the authority conferred for a different purpose in the immediately preceding section of the statute makes it clear that the PTO's authority to interpret the overlap provision is quite limited. In 35 U.S.C. § 154(b)(2)(C)(iii) the PTO is given the power to "prescribe regulations establishing the circumstances that constitute a failure of an applicant to engage in reasonable efforts to conclude processing or examination of an application" (emphasis added) -- that is, the power to elaborate on the meaning of a particular statutory term. No such power is granted under § 154(b)(3)(A). Chevron deference does not apply to the interpretation at issue here.

Statutory Construction

Chevron would not save the PTO's interpretation, however, because it cannot be reconciled with the plain text of the statute. If the statutory text is not ambiguous enough to permit the construction that the agency urges, that construction fails at Chevron's "step one," without regard to whether it is a reasonable attempt to reach a result that Congress might have intended. See, e.g., MCI v. AT&T, 512 U.S. 218, 229 (1994) ("[A]n agency's interpretation of a statute is not entitled to deference when it goes beyond the meaning that the statute can bear.").

The operative question under 35 U.S.C. § 154(b)(2)(A) is whether "periods of delay attributable to grounds specified in paragraph (1) overlap." The only way that periods of time can "overlap" is if they occur on the same day. If an "A delay" occurs on one calendar day and a "B delay" occurs on another, they do not overlap, and § 154(b)(2)(A) does not limit the extension to one day. Recognizing this, the PTO defends its interpretation as essentially running the "period of delay" under subsection (B) from the filing date of the patent application, such that a period of "B delay" always overlaps with any periods of "A delay" for the purposes of applying § 154(b)(2)(A).

The problem with the PTO's construction is that it considers the application delayed under § 154(b)(1)(B) during the

period before it has been delayed. That construction cannot be squared with the language of § 154(b)(1)(B), which applies "if the issue of an original patent is delayed due to the failure of the United States Patent and Trademark Office to issue a patent within 3 years." (Emphasis added.) "B delay" begins when the PTO has failed to issue a patent within three years, not before.

The PTO's interpretation appears to be driven by Congress's admonition that any term extension "not exceed the actual number of days the issuance of the patent was delayed," and by the PTO's view that "A delays" during the first three years of an applications' pendency inevitably lead to "B delays" in later years. Thus, as the PTO sees it, if plaintiffs' construction is adopted, one cause of delay will be counted twice: once because the PTO has failed to meet and administrative deadline, and again because that failure has pushed back the entire processing of the application into the "B period." Indeed, in the example set forth above, plaintiffs' calendar-day construction does result in a total effective patent term of 18 years under the (B) guarantee, so that - again from the PTO's viewpoint -- the applicant is not "compensated" for the PTO's administrative delay, he is benefitted by it.

But if subsection (B) had been intended to guarantee a 17-year patent term and no more, it could easily have been written that way. It is true that the legislative context -- as

distinct from the legislative history -- suggests that Congress may have intended to use subsection (B) to guarantee the 17-year term provided before GATT. But it chose to write a "[g]uarantee of no more than 3-year application pendency," 35 U.S.C. § 154(b)(1)(B), not merely a guarantee of 17 effective years of patent term, and do so using language separating that guarantee from a different promise of prompt administration in subsection (A). The PTO's efforts to prevent windfall extensions may be reasonable -- they may even be consistent with Congress's intent -- but its interpretation must square with Congress's words. If the outcome commanded by that text is an unintended result, the problem is for Congress to remedy, not the agency.

JAMES ROBERTSON
United States District Judge

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

WYETH, *et al.*,	:	
	:	
Plaintiffs,	:	
	:	
v.	:	Civil Action No. 07-1492 (JR)
	:	
JON W. DUDAS, Under Secretary of Commerce for Intellectual Property and Director of U.S. Patent and Trademark Office,	:	
	:	
Defendant.	:	

ORDER

For the reasons stated in the accompanying memorandum opinion, plaintiffs' motion for summary judgment [12] is **GRANTED** and defendant's motion for summary judgment [16] is **DENIED**. The case is remanded to the agency for further proceedings that are consistent with this opinion.

JAMES ROBERTSON
United States District Judge

ATTACHMENT B

US007464619B2

(12) **United States Patent**
Vetter

(10) **Patent No.: US 7,464,619 B2**
(45) **Date of Patent: Dec. 16, 2008**

(54) **OPERATOR ASSEMBLY**

(75) Inventor: **Gregory J. Vetter**, Owatonna, MN (US)

(73) Assignee: **Truth Hardware Corporation**, Owatonna, MN (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 592 days.

(21) Appl. No.: **10/790,667**

(22) Filed: **Mar. 1, 2004**

(65) **Prior Publication Data**

US 2004/0216541 A1 Nov. 4, 2004

Related U.S. Application Data

(60) Provisional application No. 60/451,462, filed on Mar. 1, 2003.

(51) **Int. Cl.**
F16H 35/06 (2006.01)

(52) **U.S. Cl.** **74/396**; 74/400; 384/125; 384/295

(58) **Field of Classification Search** 74/89.18, 74/89.19, 89.16, 395, 396, 397, 400, 401; 384/125, 297, 298, 299, 300, 275, 276, 282, 384/295; 49/341, 339, 345, 337
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,985,655	A *	12/1934	Floraday	74/89.19
2,050,403	A	8/1936	Weiner	
2,082,066	A	6/1937	Lackey	
2,214,280	A	9/1940	Lang	
2,321,800	A	6/1943	Cordrey et al.	
2,610,054	A	9/1952	Reynaud	
2,635,485	A	4/1953	Gravenstine et al.	
2,686,669	A *	8/1954	Johnson	74/89.14
2,795,413	A	6/1957	Rodaway	
2,899,195	A	8/1959	Ahlgren	

(Continued)

FOREIGN PATENT DOCUMENTS

WO	WO 95/18284	7/1995

OTHER PUBLICATIONS

Truth Hardware, *Rh Single Arm Operator Assembly*, Drawing, pp. 1, Jan. 28, 1993.

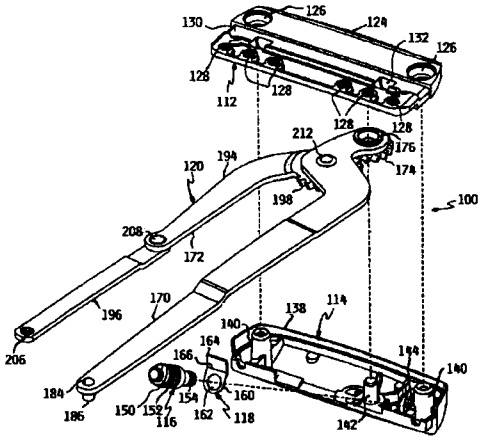
(Continued)

Primary Examiner—David M Fenstermacher
(74) *Attorney, Agent, or Firm*—Patterson, Thuente, Skaar & Christensen PA

(57) **ABSTRACT**

An operator suitable for opening and closing casement windows includes a housing (e.g., a base and a cover), and an operator arm subassembly driven by a worm. The operator arm subassembly may include at least one operator arm pivotally disposed in the housing via a flanged bearing. The operator arm may define a gear. If a plurality of operator arms are present, a sun gear may be used. The flanged bearing properly aligns the components to reduce stresses encountered during use. The flanged bearing may have a base portion, a middle portion, and an upper portion in a stepped configuration. The base may engage the base of the housing. The upper portion of the bearing may engage a cover of the housing. A middle portion of the bearing pivotally joins the arm and/or sun gear. The instant flanged bearing provides a smoother, more efficient operation and increases the useful life of the operator.

38 Claims, 16 Drawing Sheets



U.S. PATENT DOCUMENTS

2,926,905	A		3/1960	Ahlgren
3,114,542	A		12/1963	Ahlgren
3,811,715	A		5/1974	Brudy
3,846,938	A		11/1974	Kelly
4,037,483	A		7/1977	Nadal
4,241,541	A		12/1980	Van Klompenburg et al.
4,253,276	A		3/1981	Peterson et al.
4,266,371	A		5/1981	Erdman et al.
4,301,622	A		11/1981	Dunsmoor
4,305,228	A		12/1981	Nelson
4,445,794	A		5/1984	Sandberg
4,497,135	A		2/1985	Vetter
4,505,601	A		3/1985	Sandberg et al.
4,674,149	A		6/1987	Vetter
4,715,089	A		12/1987	Schema
4,726,092	A		2/1988	Tacheny et al.
4,823,508	A		4/1989	Allen
4,840,075	A		6/1989	Tucker
4,843,703	A		7/1989	Nolte et al.
4,845,830	A		7/1989	Nolte et al.
4,860,493	A		8/1989	Lense
4,887,392	A		12/1989	Lense
4,894,902	A		1/1990	Tucker
4,932,695	A		6/1990	Pettit et al.
4,938,086	A		7/1990	Nolte et al.
5,054,239	A		10/1991	Tucker et al.
5,272,837	A	*	12/1993	Nolte et al. 49/324
5,440,839	A		8/1995	Piltingsrud
5,493,813	A	*	2/1996	Vetter et al. 49/341
5,509,234	A		4/1996	Klimek et al.
5,531,138	A	*	7/1996	Vetter ..... 74/606 R
5,623,784	A		4/1997	Kuersten et al.
5,634,726	A	*	6/1997	Edele et al. 384/276
5,740,632	A		4/1998	Peterson et al.
5,765,308	A		6/1998	Anderson et al.
5,802,913	A	*	9/1998	Winner 74/89.18
5,815,984	A		10/1998	Sheets et al.
5,839,229	A		11/1998	Briggs et al.
5,937,582	A		8/1999	Taylor
6,044,587	A		4/2000	Vetter et al.
6,122,863	A		9/2000	Tippin et al.
6,128,858	A		10/2000	Vetter et al.
6,247,270	B1		6/2001	Huml
6,374,544	B1		4/2002	Ellis
6,634,141	B2		10/2003	Anderson et al.
6,640,389	B2		11/2003	Van Klompenburg et al.
6,672,010	B1	*	1/2004	Gledhill et al. 49/341
D487,012	S		2/2004	Stoll et al.
2002/0061145	A1	*	5/2002	Kobayashi et al. 384/276
2004/0223674	A1	*	11/2004	Fidziukiewicz 384/276

OTHER PUBLICATIONS

Roto Frank of America, The Roto-Pro™ Locking System, The Roto-Pro™ Hinge Series, Product Specifications, pp. 1, 2001.

Roto, The New Roto Pro-Drive™ Operator Series, pp. 1.

* cited by examiner

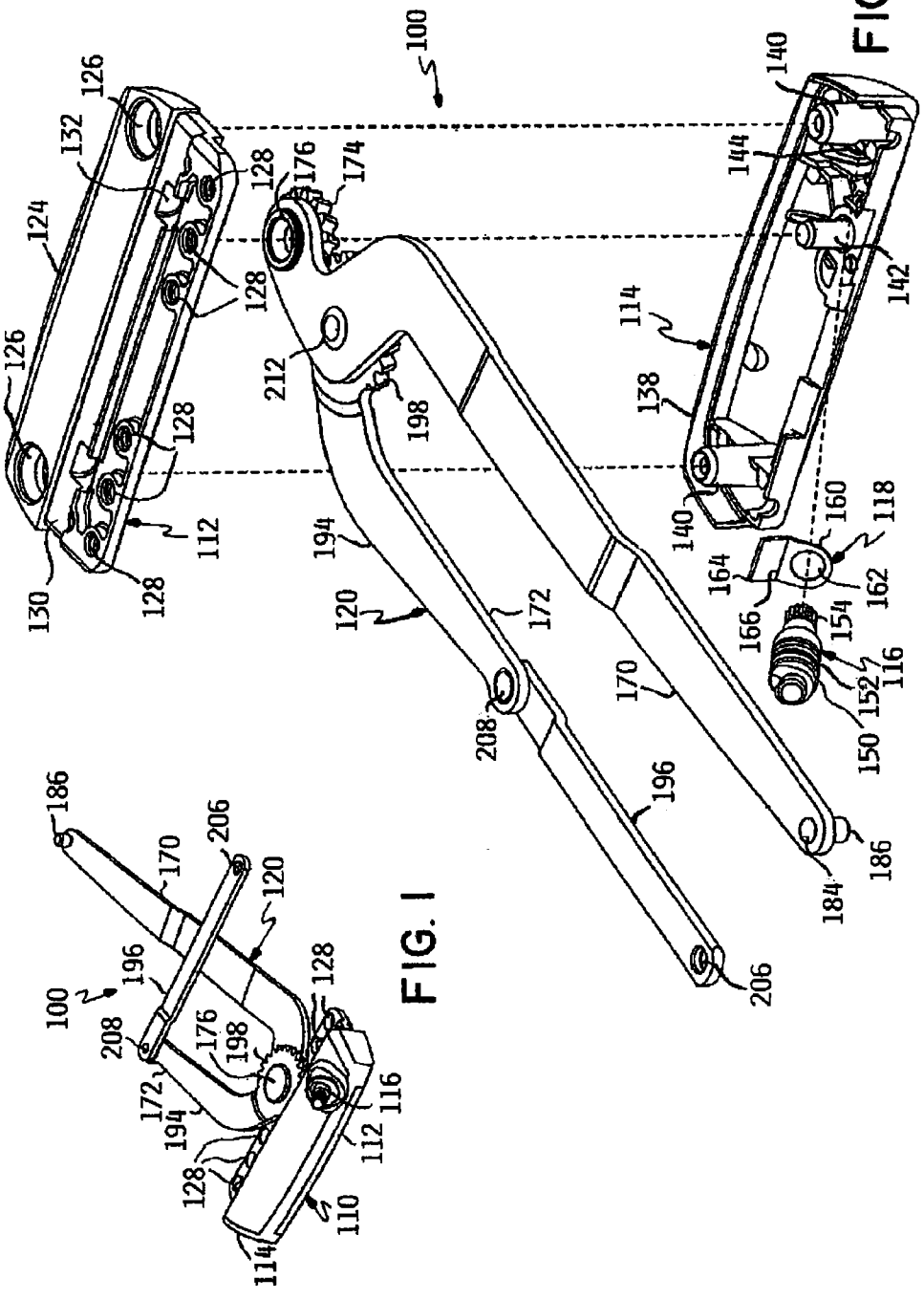

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FIG. 1

FIG. 2

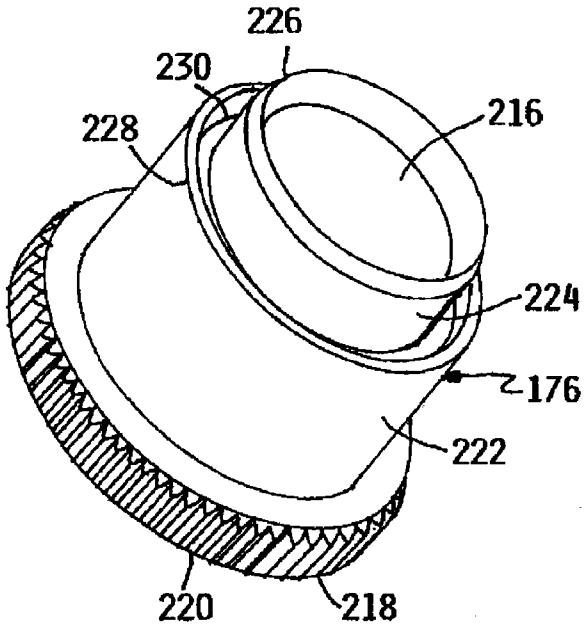
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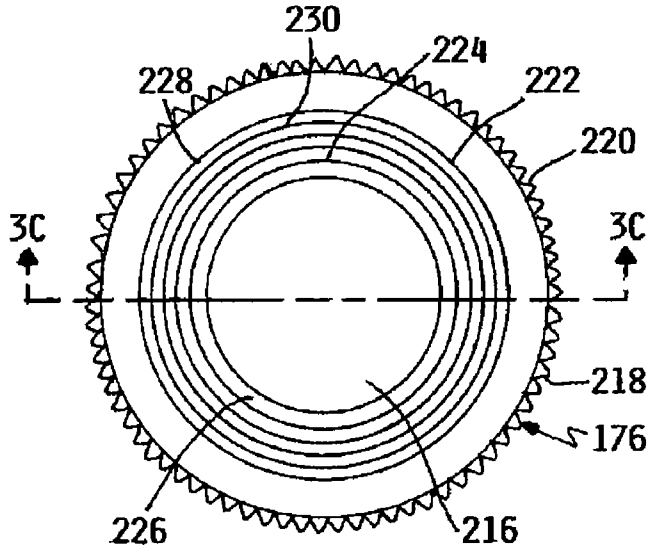
FIG. 3A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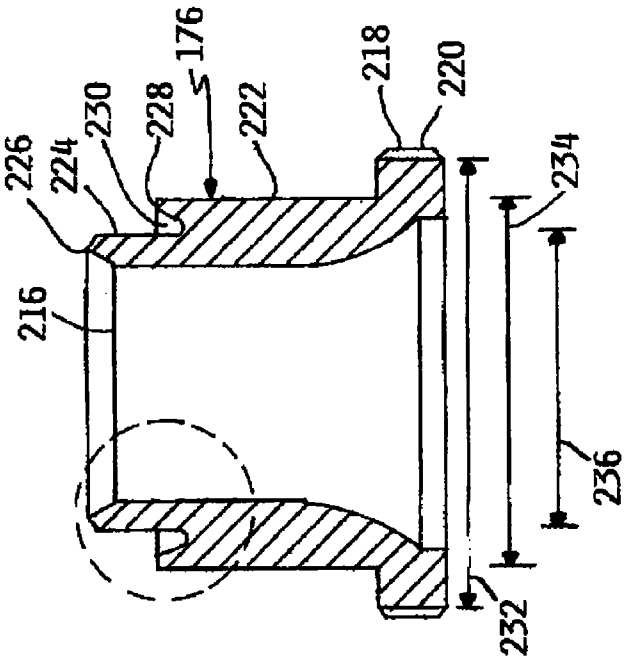
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FIG. 3C

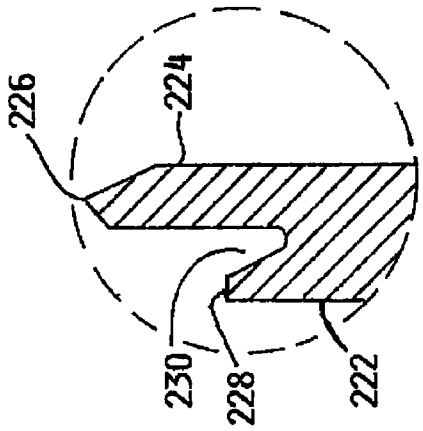
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FIG. 3D

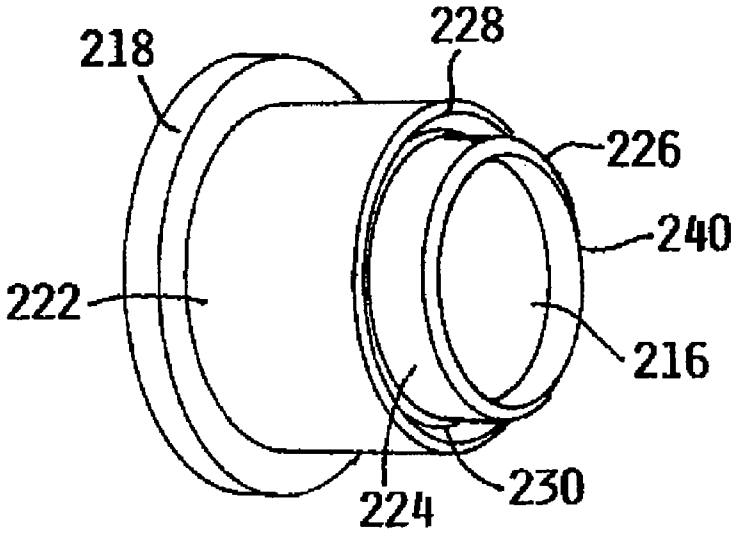

FIG. 3E

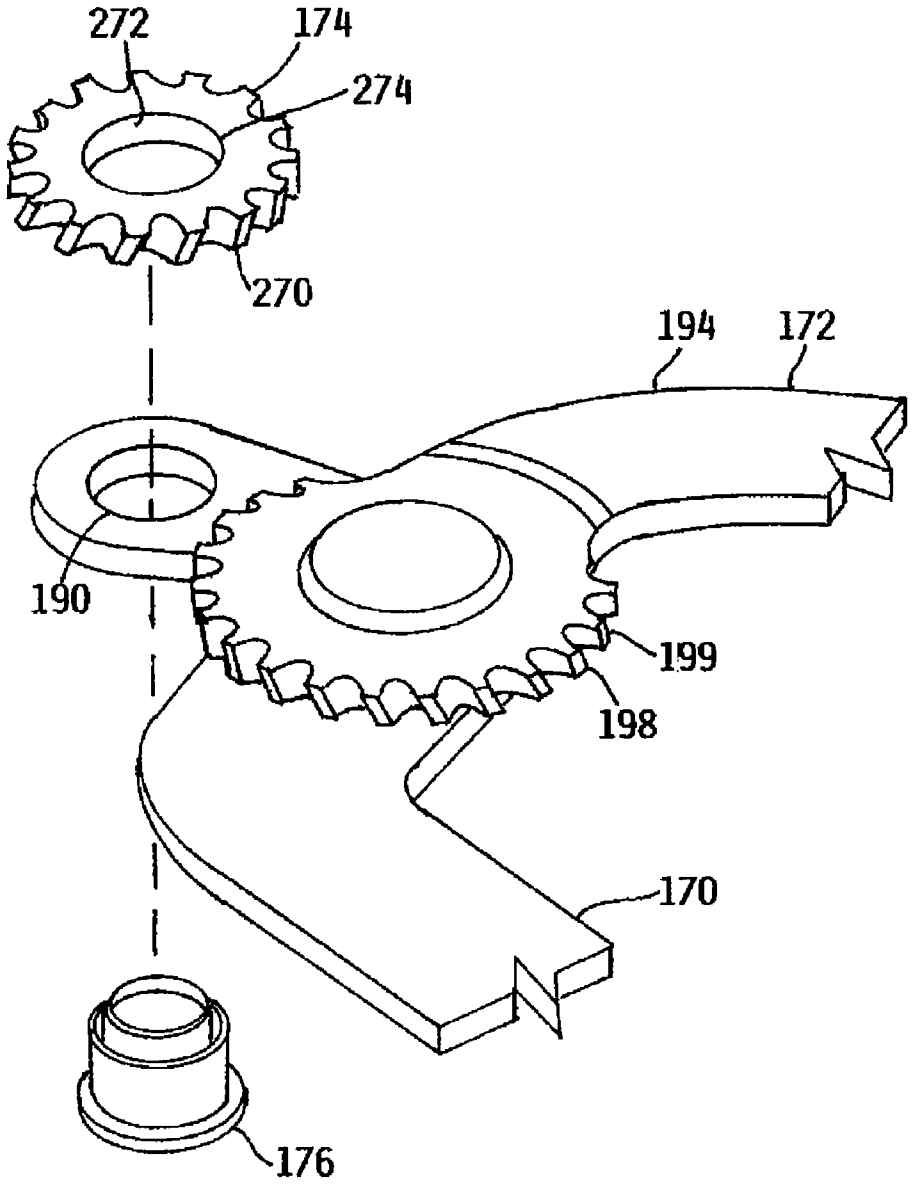

FIG. 4

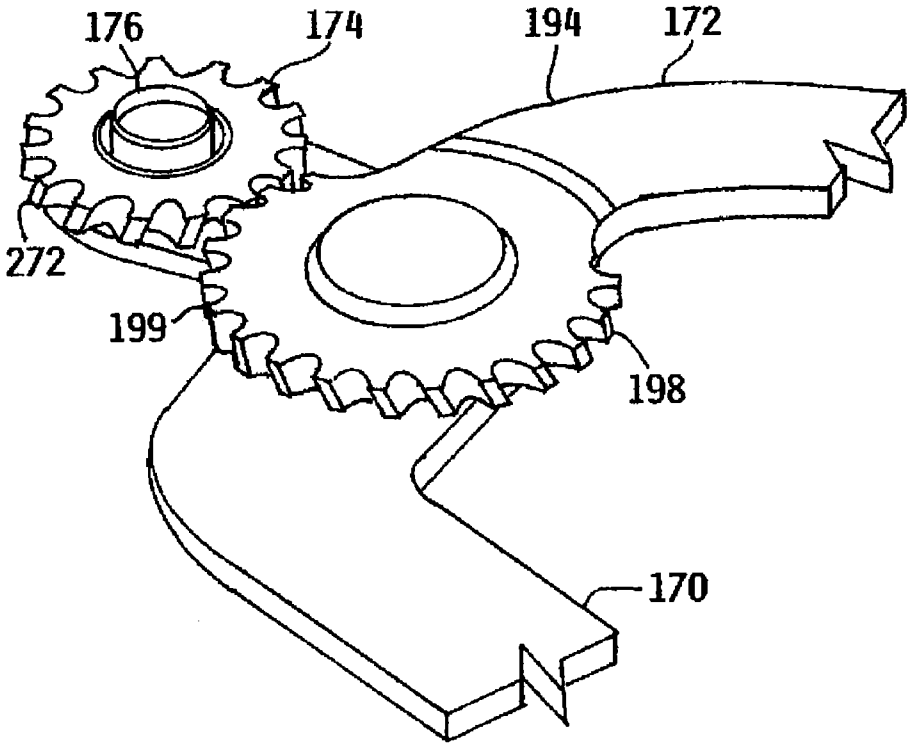

FIG. 5

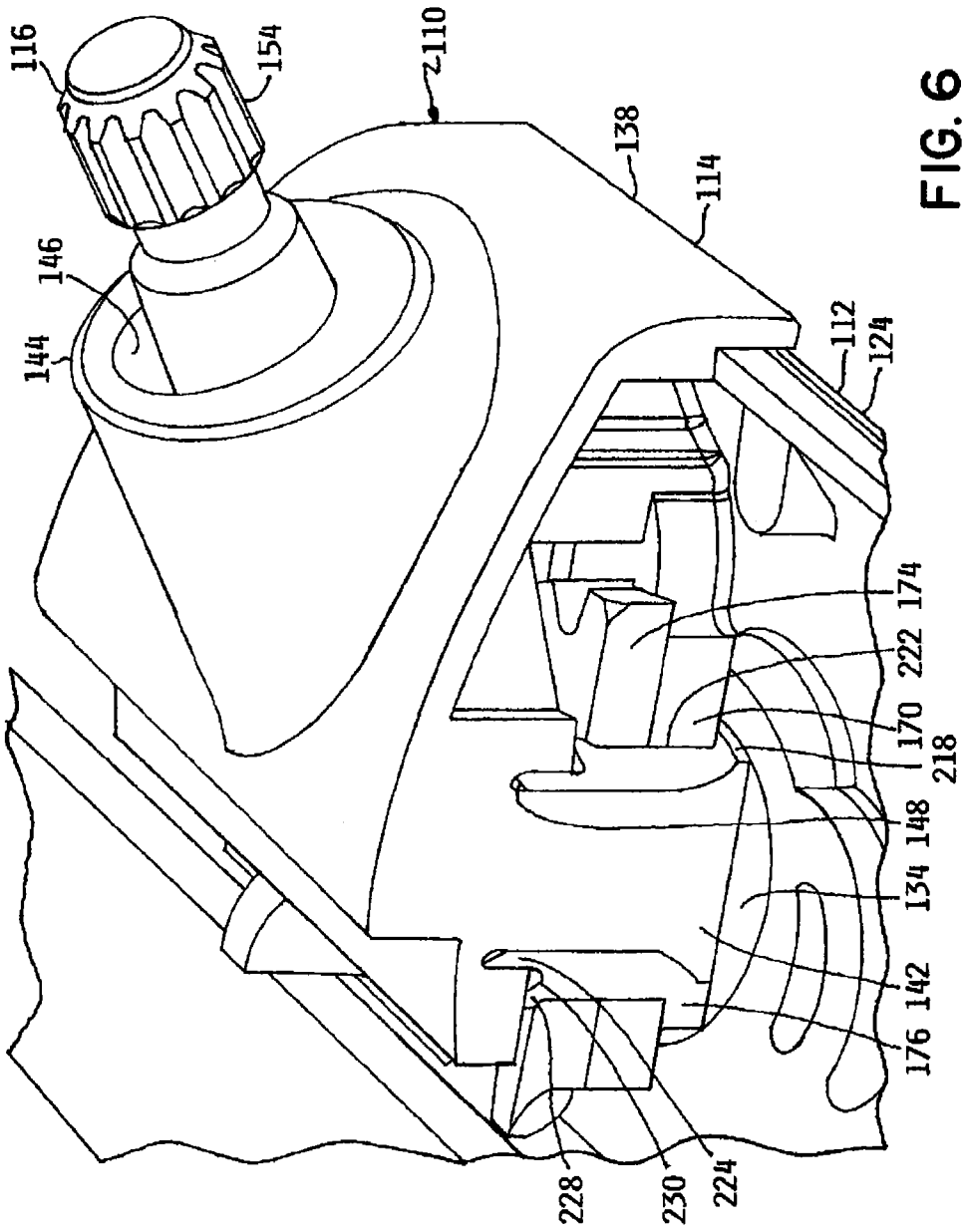
116
154
110
138
114
146
144
112
124
174
222
170
218
148
134
142
176
228
230
224

FIG. 6

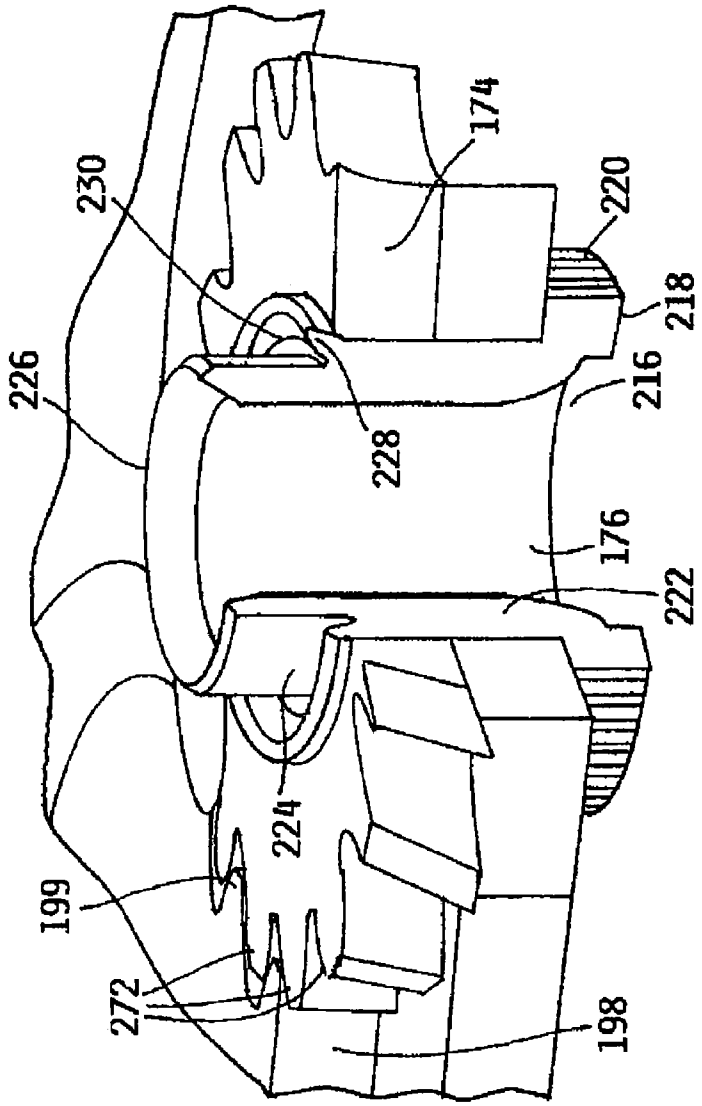

FIG. 7

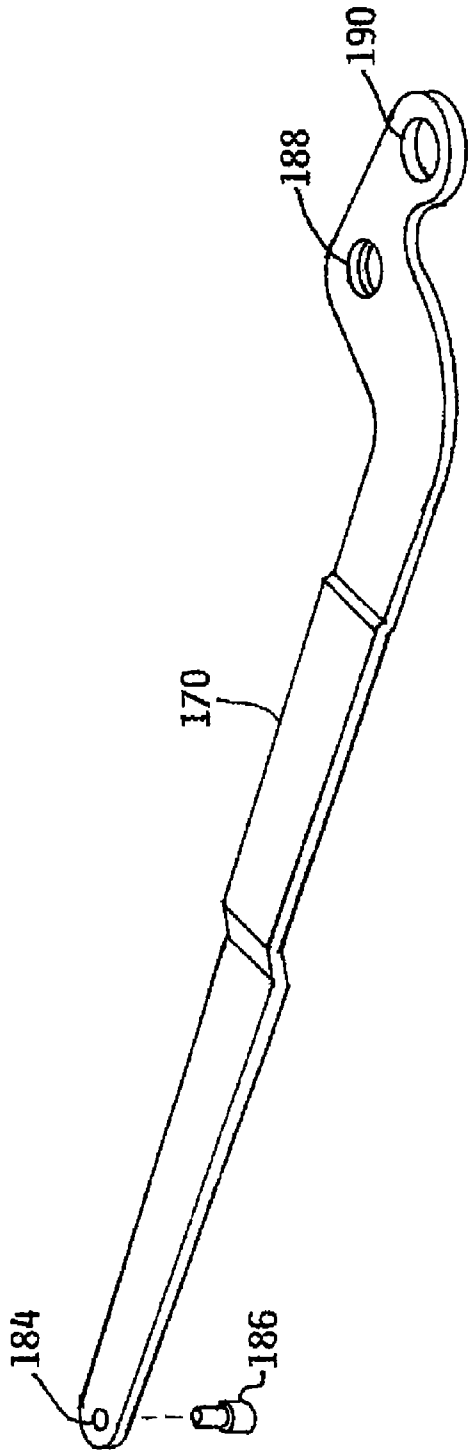

FIG. 8A

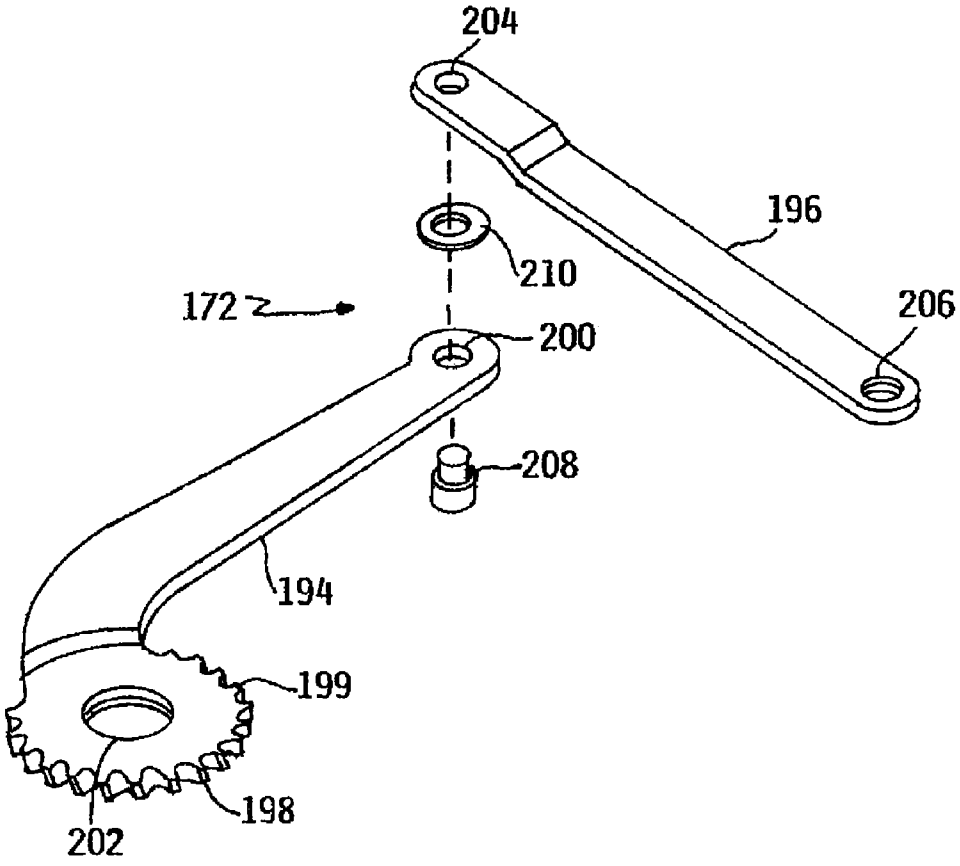

FIG. 8B

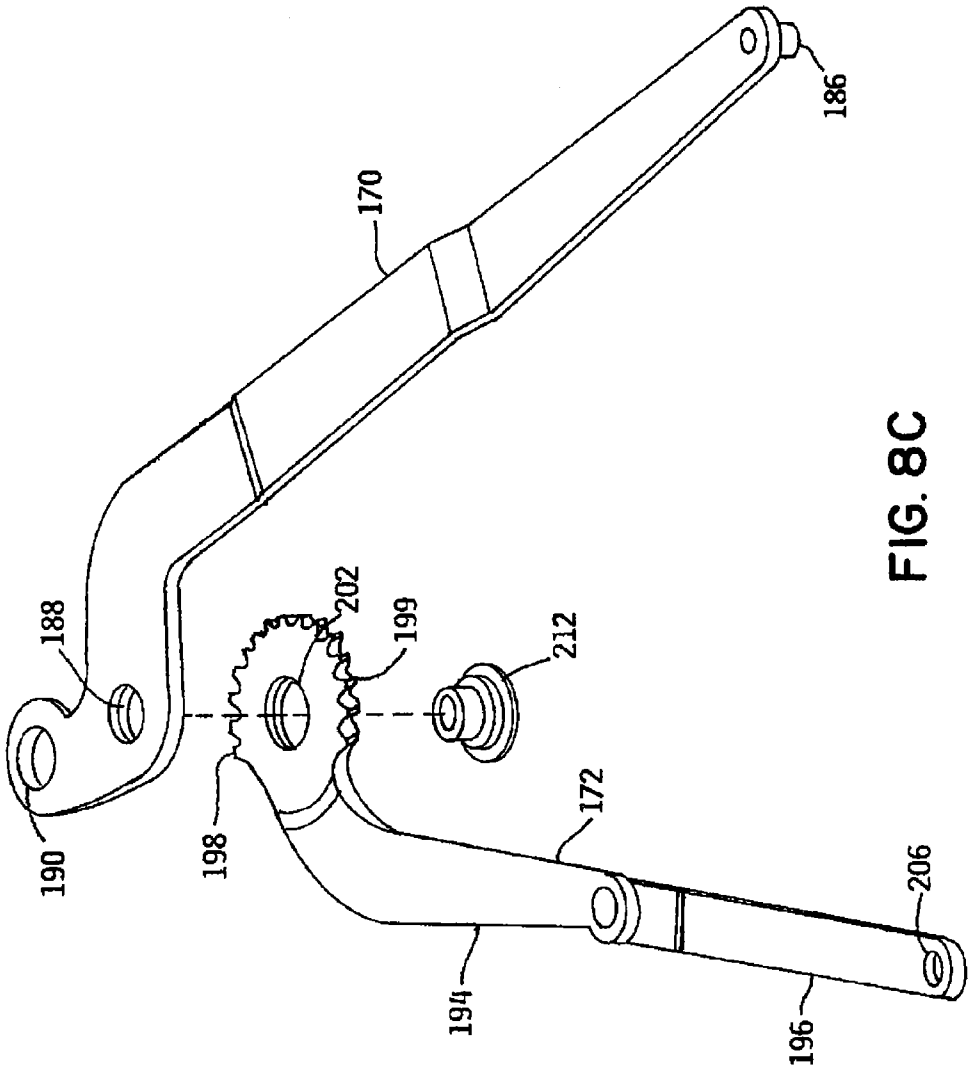

FIG. 8C

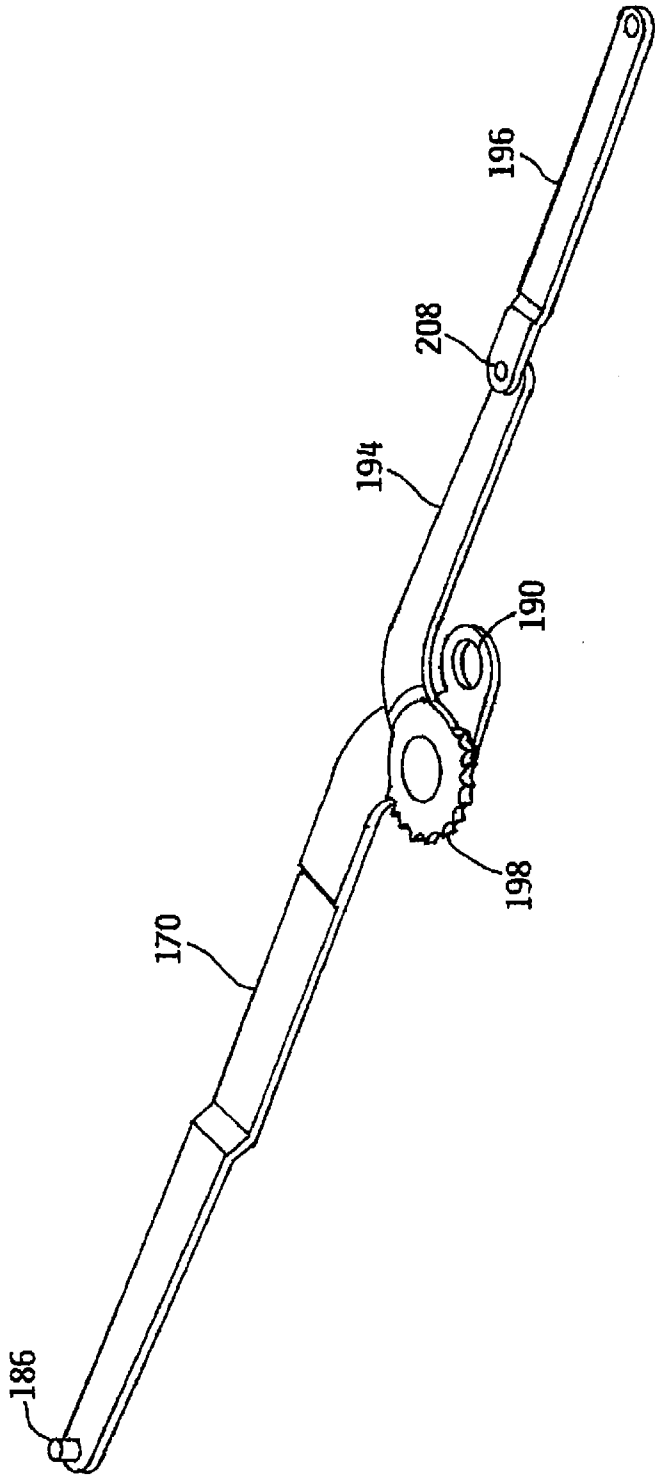

FIG. 8D

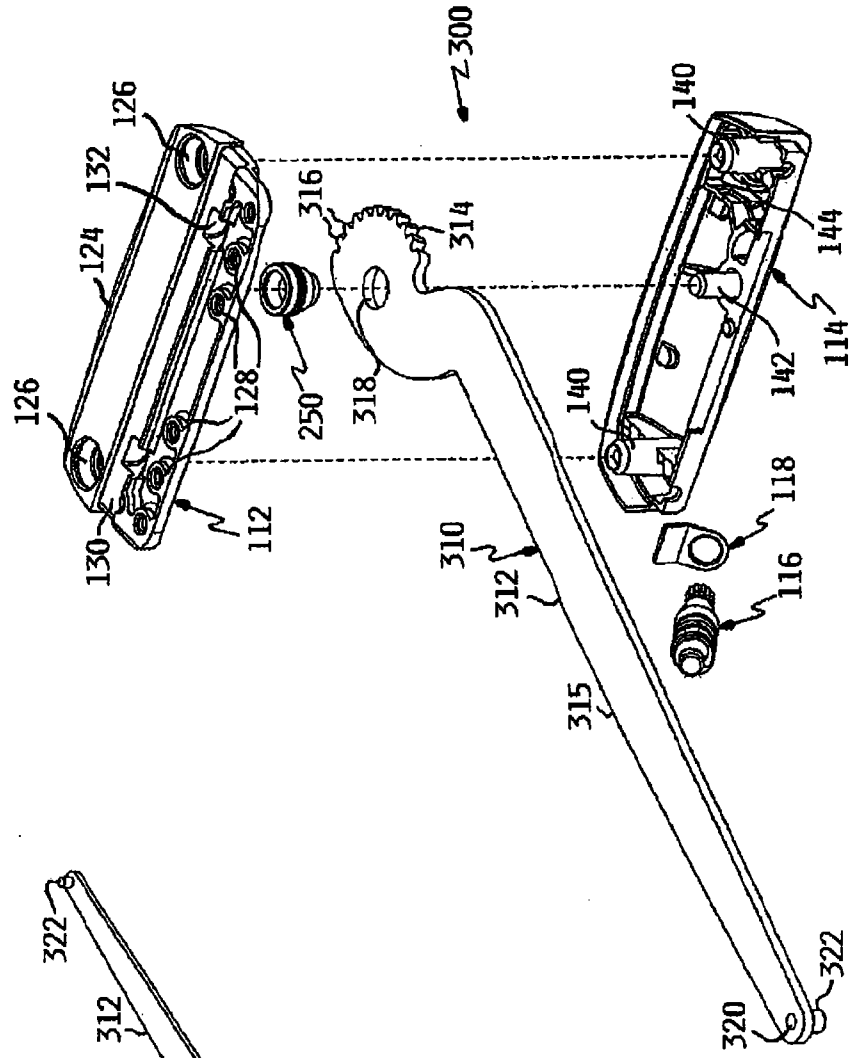
300
126
132
124
128
126
130
112
316
314
250
318
140
144
114
142
140
118
116
310
312
315
320
322

FIG. 9B

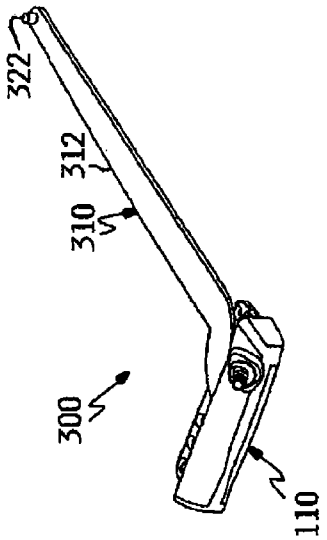
322
312
310
300
110

FIG. 9A

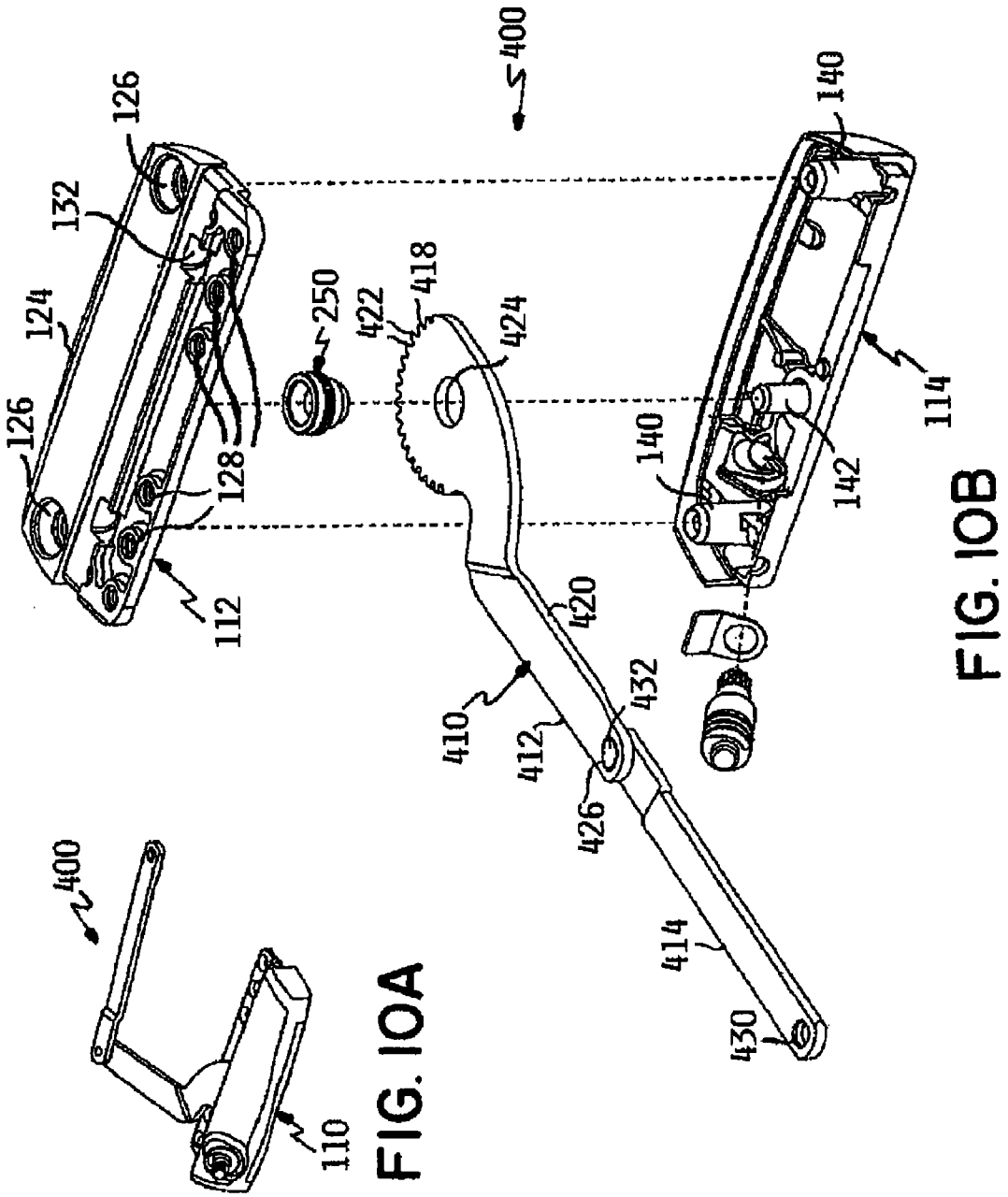

FIG. 10B

FIG. 10A

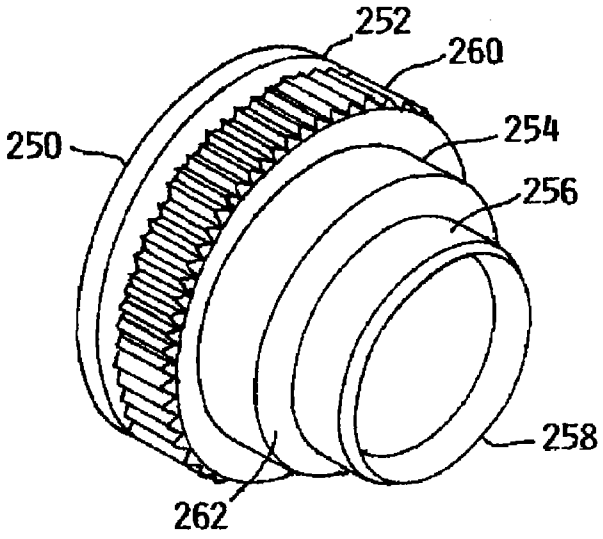

FIG. 11A

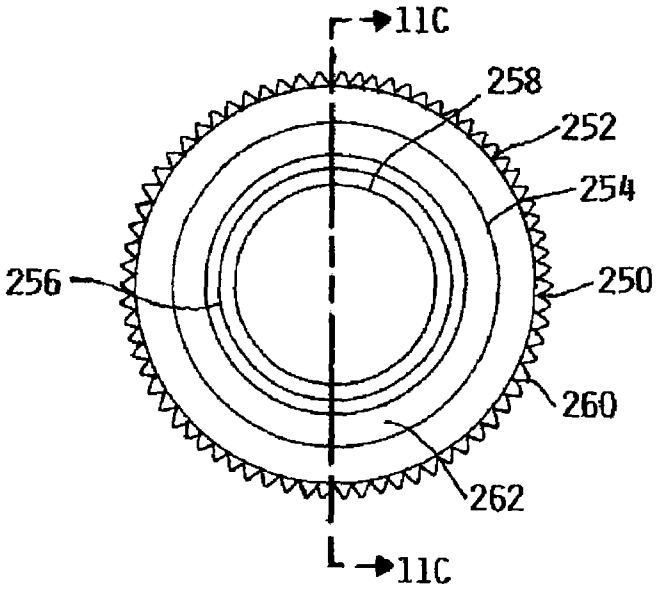

FIG. 11B

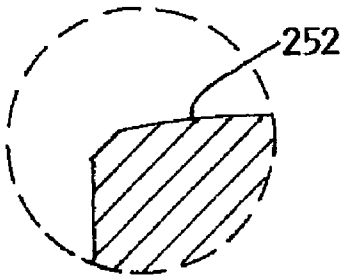

FIG. 11D

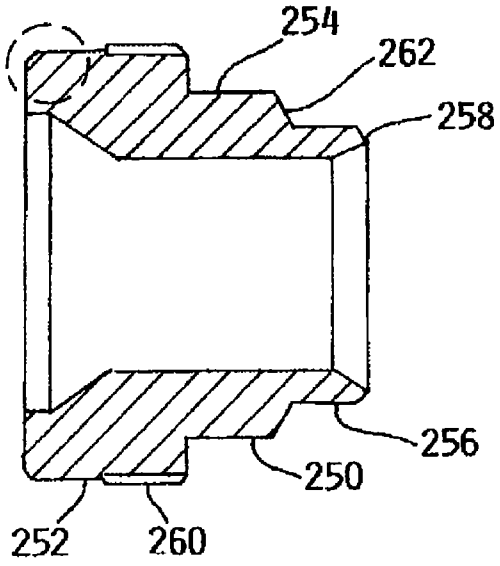

FIG. 11C

OPERATOR ASSEMBLY

CROSS-REFERENCES TO RELATED APPLICATIONS

This application claims priority under 35 U.S.C. § 119(e) to, and hereby incorporates by reference, U.S. Provisional Application No. 60/451,462, filed 1 Mar. 2003.

FIELD OF THE INVENTION

This invention relates to operators and, in particular, this invention relates to operators suitable for casement windows and awnings.

BACKGROUND OF THE INVENTION

Operators, such as those used for casement windows, typically have a mounting platform, which rotatably includes a gear and a pull arm. The gear meshes with a worm gear on a shaft, often with a handle affixed to the shaft. The pull arm is coupled to the window. Rotating the worm shaft rotates the gear and the pull arm thereby opening and closing the window. In some instances, a second pull arm is used. The second pull arm often engages the first pull arm by means of another gear or pivot arrangement, the two arms ultimately driven by rotating the single worm shaft. A typical operator of this type has a cover and a base, the cover and base trapping a first gear. At least one operator arm with a second gear affixed thereto and a bearing therebetween are pivotally installed between the cover and the base. The cover has a post at each end passing through a hole in the base and is swaged to retain the two components together when assembled.

A high torque applied to the input shaft of the operator imparts a high rotational torque on the gear. The high rotational torque causes the gear teeth to generate a undesirable axial force, in addition to the expected tangential force. The axial force tends to push the gear against the cover and at least one of the operator arms toward the base, thereby tending to separate the gear and operator arm and causing two problems. The first problem is that separation allows the gear teeth to slide away and out of position, thereby reducing the extent of the engagement between the gear teeth with other components. Overtime this separation causes failure of the gear teeth. The second problem is that the separation causes the bearing to have reduced contact with either the cover or the base. The reduced contact, in turn, generates stresses causing deformation failure of the bearing support surfaces of the base and/or the cover. These problems, either alone or in combination, will cause the window operator to become difficult to operate or to completely fail to operate.

For these reasons, there is a need for a window operator assembly which maintains proper alignment and engagement of internal components, particularly meshing gears, to prevent undue stress from inducing inefficient operation or a total failure.

SUMMARY OF THE INVENTION

This invention substantially meets the aforementioned needs of the industry by providing an improved operator assembly. The instant operator assembly advantageously opens and closes structures such as casement windows and awnings and may include a housing with a cover and base. The cover may include a central positioning post, at least one fastener post, and an angular tubular portion. The base may be attachable to the cover and may include at least one receiving aperture for receiving the at least one fastener post. A worm may be rotatably disposed within the angled tubular portion. The window operator may further include an operator arm subassembly, which may have at least one operator arm, e.g., a first operator arm, pivotally attached to a second operator arm. At least one of the operator arms defines a bearing receiving aperture and at least one of the operator arms has a portion defining a planet gear.

A sun gear may be provided to operably couple the worm and the planet gear. A bearing is used to support and hold the sun gear in place. The bearing may define an aperture and may comprise base portion, a middle portion, and an upper portion, a shoulder being defined between the middle portion and the upper portion and a recess optionally present between the shoulder and the upper portion. The bearing is inserted through the sun gear and at least one arm. The shoulder portion is then optionally flared outwardly to rotatably retain the sun gear pivotally adjacent to the at least one arm. Once the sun gear is in place, the bearing may be received by the cover positioning post and the cover receiving portion pressed into a corresponding recess in the cover. The positioning post may then be swaged to secure the bearing in place.

To complete the assembly, the base is mated to the cover by receiving at least one fastener post through at least one receiving aperture. The base is then pressed over an optionally knurled portion of the base of the bearing and at least one fastener post may be swaged to retain the base to the cover.

By providing the present operator assembly, the components thereof, more specifically the moving components, are maintained in a proper alignment, by reducing stress and unwanted binding and thus providing an efficiently functioning mechanism.

It is therefore an object of this invention, to provide an operator assembly, the operator assembly including a housing, a driving gear accommodated in the housing, a first arm, a first gear driven by the driving gear and pivoting the first arm, and a bearing. The bearing may be accommodated in the first gear and secured in the housing. The bearing may include a base, a generally cylindrical middle axially extending from the base and with a smaller radius than the base, an upper portion axially extending from the middle and with a smaller radius than the middle, and a shoulder defined between the middle and the upper portion.

A further object is to provide an operator assembly, which includes a cover, a base, a worm, a flanged bearing, and an operator arm subassembly. The cover may include an angled tubular portion and a positioning post. The base may be matable to the cover. The worm may be rotatably disposed in the tubular portion of the cover. The flanged bearing may be accommodated by the positioning post and may include a bearing base, a middle portion, an upper portion, and a shoulder defined between the middle portion and upper portion. The operator arm subassembly may include at least one arm pivotally attached between the cover and the base. The at least one arm may include a gear and may accommodate the flanged bearing. The flanged bearing and the operator subassembly may be secured together by flaring the bearing shoulder portion.

It is a yet further object is to provide an operator assembly, which includes a base, a cover mating with the base and including a positioning post, a worm rotatably accommodated by the base and the cover, an operator arm subassembly, and a flanged bearing. The operator arm subassembly may include a pivot arm, a planet gear arm pivotally joined to the pivot arm and including a planet gear, and a sun gear rotatably meshed with the worm and the planet gear. The flanged bearing may be secured between the base and the cover and

pivotally accommodated in the pivot arm and sun gear. The flanged bearing may include a bearing base, a middle portion, and upper portion, and a shoulder defined between the middle portion and the upper portion.

A still further object is to provide an operator assembly including base, a cover matable to the base, a worm, a gear arm, and a flanged bearing. The cover is mountable to the base and includes a positioning post. The worm is rotatably accommodated by the base and the cover. The gear arm includes a gear meshed to the worm and defines a gear aperture. The flanged bearing is disposed in the gear aperture and includes an aperture accommodating the positioning post, an upper portion, a middle portion extending axially from the upper portion and having a greater radius than the upper portion, a base extending axially from the middle portion and having a greater radius than the middle portion, and a shoulder defined between the middle portion and the upper portion.

A still yet further object is to provide a method of assembling an operator, the method including pivotally joining a pivot arm and a planet gear arm; inserting a flanged bearing to an aperture defined in the pivot arm and through an aperture defined in a sun gear, the flanged bearing comprising base, a middle portion axially extending from the base, an upper portion axially extending from the middle portion, and a shoulder defined between the middle portion and the upper portion; accommodating the flanged bearing about a positioning post of a base; rotatably disposing a worm in the base and in a cover, and mating the base and the cover.

A still yet further object is to provide a method of assembling an operator, the method including disposing a flanged bearing in an aperture defined in a gear, the flanged bearing comprising a bearing base, a middle portion extending from the bearing base, and upper portion extending from the middle portion, and a shoulder defined between the middle portion and the upper portion, the gear extending from a gear arm; securing the flanged bearing between a cover and base; and mating the base and the cover.

These and other objects, as well as features and advantages of this invention will become apparent from the description which follows, when considered in view of the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an isometric view of a first assembled embodiment of the operator assembly of this invention;

FIG. **2** is an exploded view of the operator assembly of FIG. **1**;

FIG. **3***a* is an isometric view of a first embodiment of the flanged bearing of this invention;

FIG. **3***b* is a top view of the flanged bearing of FIG. **3***a*;

FIG. **3***c* is a cross sectional view of the flanged bearing of FIG. **3***a*, taken along line **3***c*-**3***c* of FIG. **3***b*;

FIG. **3***d* is a fragmentary sectional view of the flanged bearing of FIG. **3***a* taken from the encircled portion of FIG. **3***c*;

FIG. **3***e* is an isometric view of another embodiment of the flanged bearing of FIGS. **3***a*-**3***d*;

FIG. **4** is an exploded view of the flanged bearing subassembly of FIGS. **1** and **2**;

FIG. **5** is an isometric view of the assembled flanged bearing subassembly depicted in FIG. **4**;

FIG. **6** is a fragmentary cross-sectional view of the assembled operator assembly of FIGS. **1** and **2**;

FIG. **7** is a fragmentary cross-sectional view of the operator arm subassembly of this invention with the flanged bearing of FIGS. **3***a*-**3***d* positioned therein;

FIG. **8***a* is an exploded view of the long arm shown in FIGS. **1** and **2**;

FIG. **8***b* is an exploded view of the planet and gear arm assembly of this invention;

FIG. **8***c* is an exploded view of a portion of the operator arm assembly of this invention;

FIG. **8***d* is an isometric view of an assembled portion of the operator arm subassembly of this invention;

FIG. **9***a* is an isometric view of a second assembled embodiment of the operator assembly of this invention;

FIG. **9***b* is an exploded view of the operator of FIG. **9***a*;

FIG. **10***a* is an isometric view of a third assembled embodiment of the operator of this invention;

FIG. **10***b* is an exploded view of the operator of FIG. **10***a*;

FIG. **11***a* is an isometric view of a third embodiment of the flanged bearing of this invention;

FIG. **11***b* is a top view of the flanged bearing of FIG. **11***a*;

FIG. **11***c* is a cross sectional view of the flanged bearing of FIG. **11***a*, taken along line **11***c*-**11***c* of FIG. **11***b*; and

FIG. **11***d* is a fragmentary sectional view of the flanged bearing of FIG. **11***a* taken from the encircled portion of FIG. **11***c*.

It is understood that the above-described figures are only illustrative of the present invention and are not contemplated to limit the scope thereof.

DETAILED DESCRIPTION OF THE INVENTION/DRAWINGS

Unless otherwise defined, all technical terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. In case of conflict, the present specification, including definitions, will control. Although methods and materials similar or equivalent to those described herein can be used to practice the invention, suitable methods and materials are described below. In addition, the materials, methods, and examples are illustrative only and not intended to be limiting.

Any references to such relative terms as inner and outer, upper and lower, or the like, are intended for convenience of description and are not intended to limit the present invention or its components to any one positional or spatial orientation. All dimensions of the components in the attached figures may vary with a potential design and the intended use of an embodiment of the invention without departing from the scope of the invention. Each of the additional features and methods disclosed herein may be utilized separately or in conjunction with other features and methods to provide improved operator assemblies and methods for making the same.

FIGS. **1**-**8***d* depict a first embodiment of the operator assembly of this invention indicated generally at **100**. Referring now to FIGS. **1** and **2**, the operator assembly **100** includes a housing **110**, which, in turn, includes a base **112** and a cover **114**. Operationally, the operator assembly **100** of this invention includes a driving gear such as a worm **116**, a bushing **118**, and an operator arm subassembly **120**. In the embodiment depicted, the base **112** has a base body **124** defining a plurality of (e.g., two) fastener post apertures **126**, a plurality of (e.g., six) attachment apertures **128**, a slot **130**, an angled support surface **132**, and a recess **134** (shown in FIG. **6**). In the embodiment depicted, the slot **130** is substantially rectangular in cross section, extending at least partially across the base. The slot **130** may be present to receive raised portions of the surface on which the instant operator is mounted and also may function to prevent infiltration of contaminants, such as air, water, or debris, from entering the instant operator. The

inner manifestation of the support surface **132** (opposite the outer support surface **132** as shown in FIG. **2**) positions and supports the worm **116**. Referring particularly to FIG. **6**, the recess **134** is dimensioned and positioned to receive a flanged bearing of the operator arm subassembly **120**, as described below.

Referring again to FIGS. **1**, **2**, and **6**, the cover **114** includes a cover body **138**, a plurality of (e.g., two) fastener posts **140**, a positioning post **142**, and an angled tubular portion **144**. The fastener posts **140** and positioning post **142** extend inwardly from the cover body **138**. As seen in FIG. **6**, the tubular portion **144** defines an aperture **146** and a recess **148** is defined in the cover body **138** to surround the positioning post **142**. The fastener posts **140** are dimensioned and positioned to be received in the fastener post apertures **126** of the base **112** and to threadably receive fasteners such as screws to affix the base **112** to the cover **114**. The positioning post is dimensioned and positioned to receive the instant flanged bearing of the operator arm subassembly **120** (described below). The angled tubular portion **144** is dimensioned to rotationally accommodate the worm **116** therewithin. The base **112** and cover **114** may be made with a zinc die case manufacture in some embodiments. However, other materials such as steel alloys, aluminum, and synthetic resins may be suitable for other embodiments.

The worm **116** includes a worm body **150** having a threaded portion **152** and a worm shaft **154** extending from the worm body **150**. The worm shaft **154** is configured to receive an actuator, such as a handle (not shown). The bushing **118** has a first portion **160** defining an aperture **162** and a generally planar second portion **164** separated from the first portion **160** by a bend **166**. The bushing aperture **162** is dimensioned to accommodate the worm shaft **154**. The bushing second portion **164** operationally supports the worm **116** and helps prevent moisture and debris from entering the instant operator.

The operator arm subassembly **120** includes a first arm such as a long (pivot) arm **170**, a second arm such as a planet gear arm **172**, a first driven gear such as a sun gear **174**, and a flanged bearing **176** (as mentioned above). Referring particularly to FIGS. **2** and **8***a*-**8***d*, the long arm **170** defines a distal aperture **184** receiving a pivot **186**, a pivot aperture **188**, and a bearing aperture **190**. The planet gear arm **172** may be considered to include an arm portion **194** and an optional extension **196**. The arm portion **194** includes a second driven gear such as a planet gear **198** with teeth **199** and defines a distal aperture **200**, the planet gear **198** defining a planet gear aperture **202**. The optional extension has proximal aperture **204** and a distal aperture **206**. The distal aperture **206** is dimensioned to accommodate a pivot **208** when the arm portions **194** and **196** are pivotally joined, optionally with a washer **210** therebetween. The long arm **170** may be pivotally attached to the planet gear arm **172** by extending a pivot pin (or other fastener) **212** through the aligned pivot aperture **188** and planet gear aperture **202**.

As best seen in FIGS. **3***a*-**3***d*, the flanged bearing **176** defines a generally coaxial aperture **216** by having a base **218** with an optional friction-increasing surface such as a knurled surface **220**, a middle portion **222**, and an upper portion **224**. The upper portion **224** displays an upper surface **226**. In the embodiment depicted, a shoulder **228** is present proximate the junction of the middle portion **222** and the upper portion **224**. A recess **230** is further defined between the shoulder **228** and the upper portion **224**. The knurled surface **220** may be useful in preventing the flanged bearing from rotating during use in some embodiments. As can be seen from FIGS. **3***a*-**3***c*, a radius **232** of the base **218** is greater than a radius **234** of the middle portion **222**, which, in turn, is greater than a radius **236** of the upper portion **224**. Referring now to FIG. **3***e*, another embodiment of the instant flanged bearing is indicated at **240**. The bearing **240** may be substantially identical to the bearing **176**, except for the absence of the knurled surface on the base **218**. Yet another embodiment of the flanged bearing of this invention is shown in FIGS. **11***a*-**11***d* at **250** and includes a base **252**, a middle portion **254**, and an upper portion **256** with an upper surface **258**. An optional knurled surface **260** is present on an upper part of the base **252**. A shoulder **262** is defined between the middle and upper portions **254** and **256**. However, unlike the shoulder **228** of the flanged bearing **176**, a recess is not defined between the shoulder **262** and the upper portion **256**. The bearings **240** and **250** also advantageously have the stepped conformation as described with respect to the bearing **176**. Some of the advantages of the stepped conformation of the instant flanged bearing are discussed below.

The sun gear **174** includes teeth **270** and defines an aperture **272**. The sun gear **174** and the planet gear **198** are dimensioned to operably mesh together and to rotate the arms **170** and **172** to a desired extent during use of the instant operator. The sun gear aperture **272** and the long arm bearing aperture **190** are further sized to rotationally accommodate the instant flanged bearing.

Referring to FIGS. **8***a*-**8***d*, the operator arms **170** and **172** of the operator arm subassembly **120** are pivotally attached by inserting the pivot pin **212** in the pivot aperture **188** and planet gear aperture **202**, respectively. If employed, the planet gear arm extension **196** is pivotally attached to the planet gear arm portion **194** by inserting the arm extension pivot pin **208** through the apertures **200** and **204** of the planet gear arm portion and extension, respectively. Referring now to FIGS. **4**-**7**, the assembly of the operator arm subassembly **120** is completed by inserting the present flanged bearing **176**, **240**, or **250**. While any of the foregoing embodiments of the present flanged bearing may be suitable, installation of the flanged bearing **176** will be described. The flanged bearing **176** is installed through the long arm aperture **190** and the sun gear aperture **174** so that the long arm **170** and sun gear **174** are positioned to rotationally contact the bearing middle portion **222**. The bearing shoulder portion **228** (or edge of the shoulder portion) is then flared outwardly to retain the sun gear **174** and long arm **170** between the flared shoulder portion **228** and the bearing base **218** (FIG. **7**), so that the long arm **170** and sun gear **174** are securely held therebetween, yet capable of rotating independently of one another. By flaring the bearing shoulder **228**, the sun gear teeth **270** are prevented from laterally displacing from a meshed position with the planet gear teeth **199**, especially when encountering high loads. Positioning the long arm **170** and sun gear **174** between the bearing flared shoulder **228** and bearing base **218** also reduces loads tending to separate the cover **114** from the base **112** as well. The optional sun gear optional countersink **274** accommodates the flared shoulder portion, thereby slightly reducing the overall height of the assembled operator assembly **100**. Alternatively, the flanged bearing shoulder **228** is not flared. Rather, the long arm **170** and sun gear **174**, when positioned as described above, are retained in place by the bearing base **218** and middle portion **222** of the flanged bearing **176**. Thus, whether flared or not, the presence of the instant flanged bearing reduces forces otherwise tending to separate the long arm **170** and the sun gear **174**.

After having assembled the operator arm subassembly **120**, the bushing **118** and worm **116** are disposed within the angular tubular portion **144**. When the worm **116** is disposed in the angular tubular portion **144**, the worm shaft **154** extends from the shaft aperture **144**. It should, however, be noted that

positioning the bushing **118** and worm **116** can occur before the operator arm subassembly **120** is that assembled, provided that the bushing **118** and worm **116** are in place before the present subassembly **120** is installed on the cover **114**. The operator arm subassembly **120** is slid over the positioning post **142** on the cover **114**. The upper portion **224** of the flanged bearing **176** is then pressed into the recess **148** defined in the cover **114** to provide positive location and to support at least a portion of the side forces generated on the flanged bearing **176** during operation. This arrangement also may eliminate the need for the post **142** to solely support side forces generated during use, thereby reducing the total stress on the post **142**. Reducing the total stress on the post **142** promotes operator longevity. The post **142** may then be optionally swaged or otherwise shaped to retain the operator arm subassembly **120** and to further sustain axial loads exerted on the flanged bearing **176** during operation. If present, the optional recess **230**, present in one embodiment of the flanged bearing, is provided for the swaged post **142** to flow into during swaging. In some embodiments presence of portions of the swaged post in the optional recess **230** slightly reduces the overall height of the assembled operator assembly **100**. Alternatively, if the flanged bearing shoulder **220** is not flared, the flared bearing **176** can be disposed about the positioning post **142** and pressed into the cover recess **148** before the arms **170** and **172** and sun gear **174** are mounted on the bearing **176**. Stated otherwise, the bearing **176** is first positioned in place, then the operator arms **170** and **172** and sun gear **174** are positioned about the bearing **176**.

When the operator arm subassembly **120** is in place, the base **112** is fitted over the cover **114** by inserting the cover fastener posts **140** through the fastener post apertures **126** of the base **112**. The base **112** is then pressed over the optionally knurled base portion **220** of the flanged bearing **176**, thereby preventing the bearing **176** from rotating during use. Contacting the base **112** to the knurled base portion **220** also allows the base **112** to support the remainder of the side forces generated against the flanged bearing **176** during operation. Finally, to retain the base **112** and the cover **114** in place, the fastener posts **140** may be swaged or staked. With the base **112** and the cover **114** attached, the worm **116**, sun gear **174**, and planet gear **198** are then rotated so that rotating the worm **176** via the worm shaft **154** and attached actuator, e.g., handle, will, in turn, pivot the operator arms **170** and **172** and thereby open or close and attached window as desired. Moreover, attaching the base **112** to the cover **114** positions the flanged bearing **176** and sun gear **174** to prevent, or otherwise minimize, axial (e.g., upward and downward) movement of the gear along the gear axis. By preventing axial movement of the sun gear **174**, the sun gear teeth **270** remain fully engaged with the worm thread **152** and planet gear teeth **199**, thereby further ensuring proper and efficient function of the window operator assembly **100**.

Referring to FIGS. **9***a* and **9***b*, another embodiment of the present operator assembly is depicted generally at **300**. The operator assembly **300** differs from the previous embodiment in the presence of a single operator arm. The other components may be similar, or substantially identical, to those described and depicted above with respect to the operator assembly **100** and are numbered similarly. The flanged bearing **250** is depicted as being used with this embodiment. However, the other embodiments of the instant flanged bearing, e.g., those designated **176**, **240** or an equivalent, could be used as well. In addition to the other components, the operator assembly **300** includes a single arm operator subassembly **310**, which, in turn, has a singular gear arm **312**. The gear arm **312** has a gear **314** and an arm portion **315**. The gear **314** is characterized by teeth **316** and a gear aperture **318**. The arm portion **315** defines a distal aperture **320** and a pivot **322** is accommodated in the distal aperture **320**.

FIGS. **10***a* and **10***b* depict a third embodiment of the present operator assembly generally at **400**. The operator assembly **400** differs from the previous embodiments **100** and **300** in the presence of a singular articulated gear arm. The other components present may be either similar, or substantially identical, to those described and depicted above with respect to the operator assembly **100** and are numbered similarly. The flanged bearing **250** is depicted as being used with this embodiment. However, it should be understood that the other embodiments, i.e., **176**, **240** or an equivalent, can be used as well. In addition to the other components, the operator assembly **400** includes an operator arm subassembly **410**, which has a gear arm **412** and an extension **414**. The gear arm **412**, in turn, has a gear **418** and an arm portion **420**. The gear **418** displays a plurality of teeth **422** and defines a gear aperture **424** and a distal aperture **426**. The arm portion **420** defines respective proximal and distal apertures **428** and **430** (aperture **428** disposed beneath aperture **426** in FIGS. **10***a* and **10***b*). A pivot **432** may be disposed in the apertures **426** and **428** to pivotally join the gear arm **412** and the extension **414**. The operator assemblies **300** and **400**, except as described above, are assembled in a substantially similar manner as the operator **100**.

With respect to operator assemblies **300** and **400**, the instant flanged bearing is placed in the aperture **318** or **424** within the gears **314** or **418**, respectively, to support the single gear arm **312** or **412**. If the flanged bearing **250** (the embodiment not defining a recess) is used, the upper shoulder portion **262** is optionally flared outwardly to locate the gears **314** or **418** in position while enabling the gear arm **312** or **412** to pivot when actuated. However, the shoulder portion **262** may not be flared, especially if only one arm is supported by the instant flanged bearing. Moreover, because the gear arm **312** or **412** is attached to the present cover **114**, separation loads normally transferred to the base **112** are reduced. Whether or not the shoulder **262** is flared, the bearing. **250** will better withstand forces generated during use and subsequently prevent separation of the base **112** and cover **114**.

Because numerous modifications of this invention may be made without departing from the spirit thereof, the scope of the invention is not to be limited to the embodiments illustrated and described. Rather, the scope of the invention is to be determined by the appended claims and their equivalents.

What is claimed is:

1. An operator assembly, comprising:

a housing;

a driving gear accommodated in the housing;

a first arm;

a first gear driven by the driving gear and pivoting the first arm; and

a bearing accommodated in the first gear and secured in the housing, the bearing comprising a base, a generally cylindrical middle axially extending from the base and with a smaller radius than the base, an upper portion axially extending from the middle and with a smaller radius than the middle, and a shoulder defined between the middle and the upper portion.

2. The operator assembly of claim **1**, in which the housing includes a base and a cover, the bearing secured between the base and the cover.

3. The operator assembly of claim **2**, in which the first gear is integral to the first arm.

4. The operator assembly of claim **3**, in which the first arm is articulated.

5. The operator assembly of claim 2, further comprising a second arm and a second gear, the second gear meshed with the first gear and pivoting the second arm.

6. The operator assembly of claim 1, in which the bearing further comprises a friction-increasing surface.

7. The operator assembly of claim 6, in which the friction-increasing surface comprises a knurling disposed proximate the bearing base.

8. The operator assembly of claim 1, in which the bearing further comprises a recess defined between the middle and the upper portion.

9. The operator assembly of claim 1, in which the driving gear includes a worm.

10. The operator assembly of claim 1, in which the bearing shoulder is swaged.

11. The operator assembly of claim 1, in which the bearing is accommodated on a positioning post.

12. The operator assembly of claim 11, in which the positioning post is swaged.

13. An operator assembly, comprising:

a cover comprising an angled tubular portion and a positioning post;

a base mated to the cover;

a worm rotatably disposed in the tubular portion;

a flanged bearing accommodated by the positioning post and comprising a base, a generally cylindrical middle portion axially extending from the base and with a smaller radius than the base, an upper portion axially extending from the middle and with a smaller radius than the middle, and a shoulder between the middle portion and upper portion, and

an operator arm subassembly comprising at least one arm pivotally attached between the cover and the base, said at least one arm comprising a gear and accommodating the flanged bearing.

14. The operator assembly of claim 13, in which the base comprises a knurled surface.

15. The operator assembly of claim 13, in which the shoulder is swaged.

16. The operator assembly of claim 13, in which the flanged bearing defines a recess between the shoulder and the upper portion.

17. The operator assembly of claim 13, in which the positioning post is swaged.

18. An operator assembly, comprising:

a base;

a cover mating with the base and comprising a positioning post;

a worm rotatably accommodated by the base and the cover;

an operator arm subassembly comprising a pivot arm, a planet gear arm pivotably joined to the pivot arm and including a planet gear portion, and a sun gear rotatably meshed with the worm and the planet gear portion; and

a flanged bearing secured between the base and the cover, pivotally accommodated in the pivot arm and sun gear, and comprising a bearing base, a middle portion, an upper portion, and a shoulder defined between the middle portion and the upper portion.

19. The operator assembly of claim 18, in which the flanged bearing further comprises a knurled surface disposed proximate the bearing base.

20. The operator assembly of claim 18, in which the bearing shoulder is swaged.

21. The operator assembly of claim 18, in which the flanged bearing defines a recess between the shoulder and the upper portion.

22. The operator assembly of claim 18, in which the flanged bearing is accommodated by the positioning post.

23. The operator assembly of claim 22, in which the positioning post is swaged.

24. An operator assembly, comprising:

a base;

a cover matable to the base and comprising a positioning post;

a worm rotatably accommodated by the base and the cover;

a gear arm comprising a gear meshed to the worm gear and defining a gear aperture; and

a flanged bearing disposed in the gear aperture and comprising a bearing aperture accommodating the positioning post, an upper portion, a middle portion extending axially from the upper portion and having a greater radius than the upper portion, a base extending axially from the middle portion and having a greater radius than the middle portion, and a shoulder defined between the middle portion and the upper portion.

25. The operator assembly of claim 24, in which the flanged bearing further comprises a knurled surface disposed proximate the bearing base.

26. The operator assembly of claim 24, in which the bearing shoulder is swaged.

27. The operator assembly of claim 24, in which the flanged bearing defines a recess between the shoulder and the upper portion.

28. The operator assembly of claim 24, in which the flanged bearing is accommodated by the positioning post.

29. The operator assembly of claim 28, in which the positioning post is swaged.

30. A method of assembling an operator, comprising:

pivotally joining a pivot arm and a planet gear arm;

inserting a flanged bearing through an aperture defined in the pivot arm and through an aperture defined in a sun gear, the flanged bearing comprising a base, a middle portion axially extending from the base and with a diameter smaller than the base, an upper portion axially extending from the middle portion and with a diameter smaller than the middle portion, and a shoulder defined between the middle portion and the upper portion;

accommodating the flanged bearing about a positioning post of a base;

swaging the shoulder;

rotatably disposing a worm in the base and in a cover; and

mating the base and the cover.

31. The method of claim 30, in which the flanged bearing further comprises a shoulder, in which the cover defines a contour accommodating the shoulder and in which the flanged bearing is secured between the cover accommodating contour and the base.

32. The method of claim 30, in which the base defines a recess and in which the bearing base is accommodated in the base recess.

33. The method of claim 30, in which the flanged bearing is secured between the base and the cover.

34. The method of claim 30, further comprising the step of swaging the positioning post.

35. A method of assembling an operator, comprising:

disposing a flanged bearing in an aperture defined in a gear, the flanged bearing comprising a bearing base, a middle portion extending from the bearing base and with a diameter smaller than the base, an upper portion extending from the middle portion and with a diameter smaller than the middle portion, and a shoulder defined between the middle portion and the upper portion, the gear extending from a gear arm;

securing the flanged bearing between a cover and a base; and

mating the base and the cover.

36. The method of claim **35**, in which the cover includes a positioning post and in which the secured flanged hearing is accommodated by the positioning post.

37. The method of claim **36**, further comprising the step of swaging the positioning post.

38. The method of claim **35**, in which the gear arm is pivotally attached to an extension.

* * * * *

ATTACHMENT C

10/790,667 OPERATOR ASSEMBLY 01-30-2009::17:14:43

Patent Term Adjustments

Patent Term Adjustment (PTA) for Application Number: 10/790,667

Filing or 371(c) Date:	03-01-2004	USPTO Delay (PTO) Delay (days):	716
Issue Date of Patent:	12-16-2008	Three Years:	-
Pre-Issue Petitions (days):	+0	Applicant Delay (APPL) Delay (days):	124
Post-Issue Petitions (days):	+0	Total PTA (days):	592
USPTO Adjustment(days):	+0	Explanation Of Calculations	

Patent Term Adjustment History

Date	Contents Description	PTO(Days)	APPL(Days)
11-25-2008	PTA 36 Months		
12-16-2008	Patent Issue Date Used in PTA Calculation		
11-14-2008	Dispatch to FDC		
11-14-2008	Application Is Considered Ready for Issue		
11-13-2008	Workflow - Drawings Finished		34
11-13-2008	Issue Fee Payment Verified		↑
11-13-2008	Issue Fee Payment Received		↑
09-04-2008	Mail Notice of Allowance		↑
08-30-2008	Document Verification		↑
08-30-2008	Notice of Allowance Data Verification Completed		↑
07-24-2008	Date Forwarded to Examiner		↑
06-11-2008	Response after Non-Final Action		58
06-11-2008	Request for Extension of Time - Granted		↑
01-14-2008	Mail Non-Final Rejection		↑
01-11-2008	Non-Final Rejection		
11-19-2007	Affidavit(s) (Rule 131 or 132) or Exhibit(s) Received		
12-05-2007	Date Forwarded to Examiner		
11-19-2007	Response after Non-Final Action		32
11-19-2007	Request for Extension of Time - Granted		↑
08-15-2007	Miscellaneous Incoming Letter		↑
07-18-2007	Mail Non-Final Rejection		↑
07-16-2007	Non-Final Rejection		
12-13-2004	Information Disclosure Statement considered		
07-29-2004	Information Disclosure Statement considered		
05-16-2007	Date Forwarded to Examiner		
05-14-2007	Response to Election / Restriction Filed		
04-17-2007	Mail Restriction Requirement	716	
04-13-2007	Requirement for Restriction / Election	↑	
08-08-2006	Mail Miscellaneous Communication to Applicant	↑	
08-08-2006	Miscellaneous Communication to Applicant - No Action Count	↑	

09-16-2005	Miscellaneous Incoming Letter	
01-30-2006	Miscellaneous Incoming Letter	
09-16-2005	Miscellaneous Incoming Letter	
04-08-2005	IFW TSS Processing by Tech Center Complete	
04-08-2005	Case Docketed to Examiner in GAU	
09-27-2004	Reference capture on IDS	
07-29-2004	Information Disclosure Statement (IDS) Filed	
07-29-2004	Information Disclosure Statement (IDS) Filed	
01-14-2005	Reference capture on IDS	
12-13-2004	Information Disclosure Statement (IDS) Filed	
12-13-2004	Information Disclosure Statement (IDS) Filed	
07-28-2004	Application Return from OIPE	
07-28-2004	Application Return TO OIPE	
07-28-2004	Application Dispatched from OIPE	
07-28-2004	Application Is Now Complete	
07-02-2004	Payment of additional filing fee/Preexam	
07-02-2004	A statement by one or more inventors satisfying the requirement under 35 USC 115, Oath of the Applic	
05-24-2004	Notice Mailed--Application Incomplete--Filing Date Assigned	
03-23-2004	Cleared by OIPE CSR	
03-22-2004	IFW Scan & PACR Auto Security Review	
03-01-2004	Initial Exam Team nn	

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